

The effects of MgO in the Pd/Al₂O₃-MgO catalyst toward selective hydrogenation reaction

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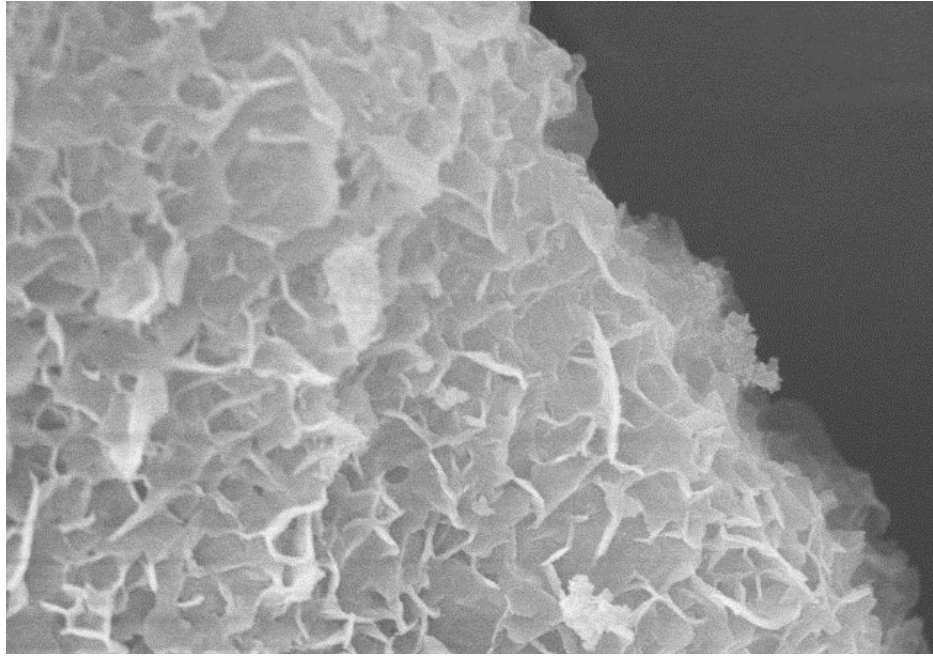


Figure S1. SEM image of Pd/Al₂O₃-0.12MgO.

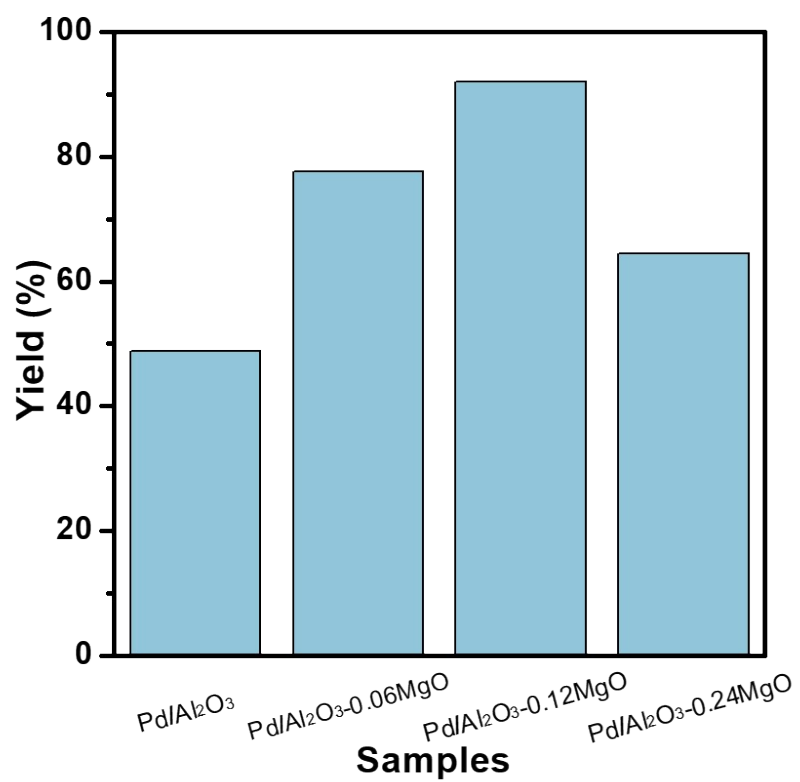


Figure S2. The product yield of selective hydrogenation of isoprene over different catalysts. [Reaction conditions: 60 °C, H₂ pressure 1.0 MPa, LHSV 20 h⁻¹, H₂/liquid (V/V) 200].

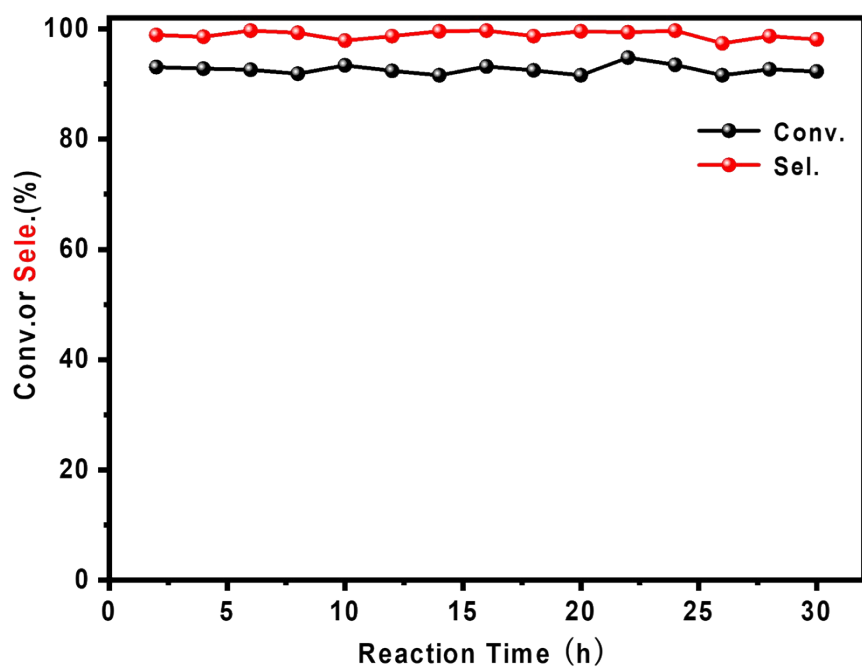


Figure S3. Long-term test for the selective hydrogenation of isoprene over Pd/Al₂O₃-0.12MgO. [Reaction conditions: 60 °C, H₂ pressure 1.0 MPa, LHSV 20 h⁻¹, H₂/liquid (V/V) 200].

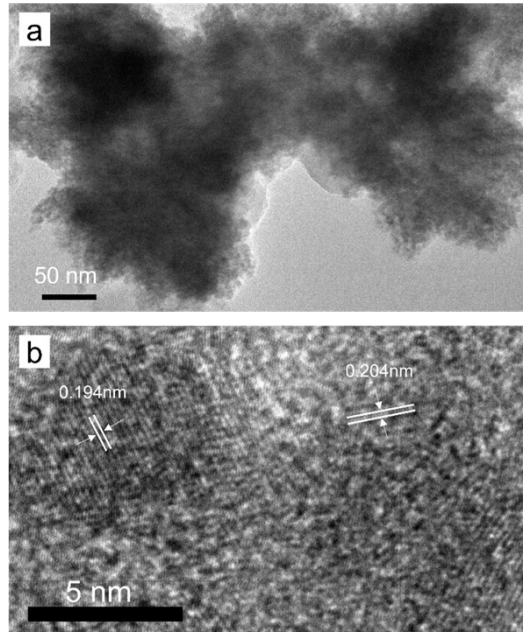


Figure S4. TEM (a) and high-resolution TEM (b) images of Pd/Al₂O₃-0.12MgO.

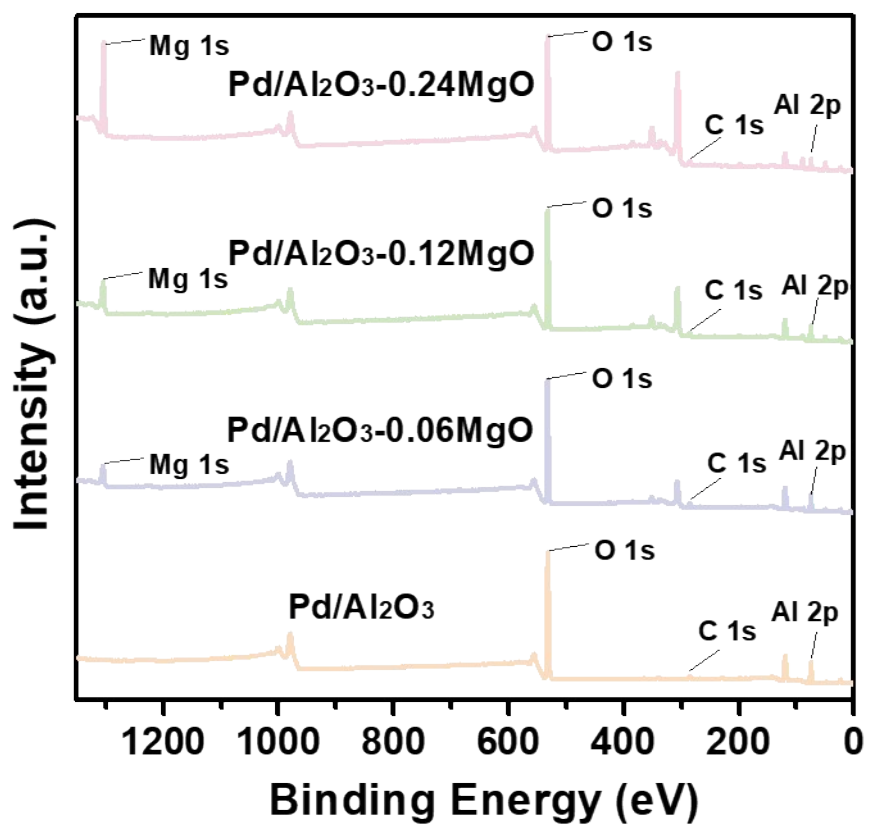


Figure S5. The full XPS spectrum of four different supports.

Table S1. The reaction rates (R) and turnover frequencies (TOF) of Pd/Al₂O₃ based catalysts.

Catalysts	R(mmol • h ⁻¹)	TOF(h ⁻¹)
Pd/Al ₂ O ₃	0.011	5642
Pd/Al ₂ O ₃ -0.06MgO	0.016	8623
Pd/Al ₂ O ₃ -0.12MgO	0.019	9901
Pd/Al ₂ O ₃ -0.24MgO	0.012	6600

Table S2. Comparison of catalytic performance of semi-hydrogenation reaction.

Catalysts	Reaction conditions	Conversion	Selectivity	Ref.
Pd/Al ₂ O ₃ -0.12MgO	60 °C/1.0 MPa	93%	99%	this work
PdAgCu	100°C/2.0MPa	98%	92%	[1]
Pd/CNA-4	60 °C/1.0 MPa	89%	98%	[2]
NiMo-2/Al ₂ O ₃	110°C/2.0MPa	93%	99%	[3]
ThNi ₂ / Al ₂ O ₃	100°C/0.26MPa	44%	95%	[4]

References

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